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FOR

GRAPHICAL USER INTERFACE FOR PROCURING TELECOMMUNICATIONS
SERVICES ON-LINE

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TITLE OF THE INVENTION

GRAPHICAL USER INTERFACE FOR PROCURING TELECOMMUNICATIONS SERVICES ON-LINE

CROSS REFERENCE TO RELATED CASES

[01] The present invention claims the benefit of priority under 35 U.S.C. § 119(e) to United States Provisional Patent Application Number 60/263,222 of *Diemer et al.*, entitled "ON-LINE SERVICING SYSTEM," filed on January 23, 2001 and is related to the following commonly owned co-pending United States Patent Applications to *Felkey et al.*, filed herewith, entitled: (1) "METHOD AND SYSTEM FOR PROVIDING SOFTWARE INTEGRATION FOR A TELECOMMUNICATIONS SERVICES ON-LINE PROCUREMENT SYSTEM," Serial No. xx/xxx,xxx, Atty. Dock. No. 09710-1124/WMA-01-004 and (2) "METHOD AND SYSTEM FOR PROCURING TELECOMMUNICATIONS SERVICES ON-LINE," Serial No. xx/xxx,xxx, Atty. Dock. No. 09710-1116/WMA-01-001, the entire contents of all of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

[02] The present invention relates to an information processing system and more particularly to a graphical user interface for procuring telecommunications offerings (e.g., telecommunications products and/or services) on-line.

DISCUSSION OF THE BACKGROUND

[03] From the perspective of the customers of telecommunication services, the interaction between them and the customer representatives have been inefficient and frustrating. Because of the emergence of the many, and often perplexing, telecommunication services, the experience that the customers undergo when procuring services is far from user friendly. Further, customers do not enjoy dialing into a call center to wait in queue for a customer representative to tend to them, with no guarantees that the customer representative can adequately service their needs.

[04] Service providers, therefore, have sought to provide a self-service on-line system through the use of the World Wide Web (WWW). However, ineffective user interfaces and non-integrated systems have introduced the same, if not greater, level of frustration than interacting with a live human. In particular, in light of the sophistication of modern telecommunication services, a live person may be required to intercede in the procurement process.

[05] Based on the foregoing, there is a clear need for improved approaches for servicing customers via an on-line system to procure telecommunications services. There is also a need to enhance the efficiency of provisioning telecommunications services for the customers. There is a further need to cater to customers of varying level of sophistication, such that customers who require greater assistance are given the necessary attention.

[06] Based on the need to enhance the customer experience in procuring telecommunication services, an approach for implementing an on-line system that provides a user-friendly and efficient mechanism to acquire services from a service provider is highly desirable.

SUMMARY OF THE INVENTION

[07] The present invention addresses the above stated and other needs by providing an on-line system that offers an effective mechanism to efficiently procure telecommunication services. The system provides a new customer experience for pre-sale, order processing, and post-sale support. For pre-sale services, a prospective customer links to the site of, for example, a proprietary telecommunications service provider (or directly at a site promoting itself) and are presented with product materials and tools. Once the prospective customer has determined the services appropriate to his/her business and the system has qualified them, they may enter a Shopping Cart/Service Ordering section of the site, select their services and click on, for example, an "Order Now" button to proceed. Afterwards, a new customer may then enter either the site (or other on-line applications, such as Interact, etc.) to check order status, manage existing services, place additional orders, pay on-line, etc.

[08] According to one aspect of the invention, there is provided a method for procuring telecommunications offerings on-line, including presenting a graphical user interface (GUI),

including a telecommunications offerings region located in a portion of the GUI, the telecommunications offerings region including, a voice telecommunications offerings sub-region for providing access to voice telecommunications offerings, an Internet telecommunications offerings sub-region for providing access to Internet telecommunications offerings, and a mobile telecommunications offerings sub-region for providing access to mobile telecommunications offerings.

[09] According to another aspect of the invention, there is provided a method for procuring telecommunications offerings on-line, including presenting a graphical user interface (GUI), including a search region located in a central portion of the GUI, the search region including a search for dropdown list, a search criteria sub-region, and reset and search buttons; and a tab region located in an upper portion of the GUI and including log off, user home, manage agents, customer home, shop, and cart tabs. The search for dropdown list is configured to select from a plurality of search items, including orders, customers, and move, change or disconnection (MCD) of an order, the search criteria sub-region is configured with fields and dropdown lists for entering search criteria information for a selected search item, the reset button is configured to clear entered search criteria information, the search button is configured to perform a search based on entered search criteria information, the log off tab is configured to log off a user from an on-line session, the user home tab is configured to display the search region, the manage agents tab is configured to display a window for creating and managing users of the GUI, the customer home tab is configured to display a customer facing GUI, the shop tab is configured to display web links to information on the telecommunications offerings, and the cart tab is configured to display a window including a shopping cart function.

[10] According to another aspect of the invention, there is provided a method for generating a graphical user interface (GUI) for procuring telecommunications offerings on-line, including generating a telecommunications offerings region located in a portion of the GUI; generating, in the telecommunications offerings region, a voice telecommunications offerings sub-region for providing access to voice telecommunications offerings; generating, in the telecommunications offerings region, an Internet telecommunications offerings sub-region for providing access to Internet telecommunications offerings; and generating, in the telecommunications offerings

region, a mobile telecommunications offerings sub-region for providing access to mobile telecommunications offerings.

[11] According to another aspect of the invention, there is provided a method for generating a graphical user interface (GUI) for servicing telecommunications offerings on-line, including generating a search region located in a central portion of the GUI, the search region including a search for dropdown list, a search criteria sub-region, and reset and search buttons; and generating a tab region located in an upper portion of the GUI and including log off, user home, manage agents, customer home, shop, and cart tabs. The search for dropdown list is configured to select from a plurality of search items, including orders, customers, and move, change or disconnection (MCD) of an order, the search criteria sub-region is configured with fields and dropdown lists for entering search criteria information for a selected search item, the reset button is configured to clear entered search criteria information, the search button is configured to perform a search based on entered search criteria information, the log off tab is configured to log off a user from an on-line session, the user home tab is configured to display the search region, the manage agents tab is configured to display a window for creating and managing users of the GUI, the customer home tab is configured to display a customer facing GUI, the shop tab is configured to display web links to information on the telecommunications offerings, and the cart tab is configured to display a window including a shopping cart function.

[12] According to another aspect of the invention, there is provided a method for generating graphical user interfaces (GUIs) for procuring and servicing telecommunications offerings on-line, including generating a telecommunications offerings region located in a portion of a first GUI; generating, in the telecommunications offerings region, a voice telecommunications offerings sub-region for providing access to voice telecommunications offerings; generating, in the telecommunications offerings region, an Internet telecommunications offerings sub-region for providing access to Internet telecommunications offerings; generating, in the telecommunications offerings region, a mobile telecommunications offerings sub-region for providing access to mobile telecommunications offerings; generating a search region located in a central portion of a second GUI, the search region including a search for dropdown list, a search criteria sub-region, and reset and search buttons; and generating a tab region located in an upper portion of the

second GUI and including log off, user home, manage agents, customer home, shop, and cart tabs.

[13] According to another aspect of the invention, there is provided a system for procuring and servicing telecommunications offerings on-line, including a server including a server program configured to transmit data for generating a customer GUI on a customer computer, the customer GUI including a telecommunications offerings region, including a voice telecommunications offerings sub-region for providing access to voice telecommunications offerings, an Internet telecommunications offerings sub-region for providing access to Internet telecommunications offerings, and a mobile telecommunications offerings sub-region for providing access to mobile telecommunications offerings; the server program configured to generate a back office GUI on a back office computer, the back office GUI including a search region located in a central portion thereof and including a search for dropdown list, a search criteria sub-region, and reset and search buttons; and the back office GUI including a tab region located in an upper portion thereof and including log off, user home, manage agents, customer home, shop, and cart tabs.

[14] According to another aspect of the invention, there is provided a graphical user interface (GUI) apparatus for procuring telecommunications offerings on-line, including means for generating a telecommunications offerings region located in a portion of the GUI; means for generating, in the telecommunications offerings region, a voice telecommunications offerings sub-region for providing access to voice telecommunications offerings; means for generating, in the telecommunications offerings region, an Internet telecommunications offerings sub-region for providing access to Internet telecommunications offerings; and means for generating, in the telecommunications offerings region, a mobile telecommunications offerings sub-region for providing access to mobile telecommunications offerings.

[15] According to another aspect of the invention, there is provided a graphical user interface (GUI) apparatus for servicing telecommunications offerings on-line, including means for generating a search region located in a central portion of the GUI, the search region including a search for dropdown list, a search criteria sub-region, and reset and search buttons; and means for generating a tab region located in an upper portion of the GUI and including log off, user home, manage agents, customer home, shop, and cart tabs. The search for dropdown list is configured

to select from a plurality of search items, including orders, customers, and move, change or disconnection (MCD) of an order, the search criteria sub-region is configured with fields and dropdown lists for entering search criteria information for a selected search item, the reset button is configured to clear entered search criteria information, the search button is configured to perform a search based on entered search criteria information, the log off tab is configured to log off a user from an on-line session, the user home tab is configured to display the search region, the manage agents tab is configured to display a window for creating and managing users of the GUI, the customer home tab is configured to display a customer facing GUI, the shop tab is configured to display web links to information on the telecommunications offerings, and the cart tab is configured to display a window including a shopping cart function.

[16] Still other aspects, features, and advantages of the present invention are readily apparent from the following detailed description, simply by illustrating a number of particular embodiments and implementations, including the best mode contemplated for carrying out the present invention. The present invention is also capable of other and different embodiments, and its several details can be modified in various respects, all without departing from the spirit and scope of the present invention. Accordingly, the drawing and description are to be regarded as illustrative in nature, and not as restrictive.

BRIEF DESCRIPTION OF THE DRAWINGS

[17] The present invention is illustrated by way of example, and not by way of limitation, in the figures of the accompanying drawings and in which like reference numerals refer to similar elements and in which:

[18] Figure 1 is a top-level block diagram illustrating a system for procuring telecommunications products and/or services;

[19] Figure 2 is a flowchart illustrating a flow for procuring telecommunications products and/or services;

- [20] Figure 3 is a top-level block diagram illustrating a system for procuring telecommunications products and/or services on-line;
- [21] Figure 4 is a flowchart illustrating a flow for procuring telecommunications products and/or services on-line;
- [22] Figure 5a is a top level block diagram illustrating a logical architecture employed in the system for a graphical user interface for procuring telecommunications products on-line;
- [23] Figures 5b-5c are exemplary screen shots illustrating a customer graphical user interface for procuring telecommunications products on-line;
- [24] Figures 5d-5r are exemplary screen shots illustrating a customer graphical user interface for procuring telecommunications products on-line;
- [25] Figures 6a-6t are exemplary screen shots illustrating a back office graphical user interface for procuring telecommunications products on-line; and
- [26] Figure 7 is an exemplary computer system, which may be programmed to perform one or more of the processes of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[27] A graphical user interface procuring telecommunications products on-line are described. In the following description, for purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the present invention. It is apparent to one skilled in the art, however, that the present invention may be practiced without these specific details or with an equivalent arrangement. In some instances, well-known structures and devices are shown in block diagram form in order to avoid unnecessarily obscuring the present invention.

[28] The present invention includes recognition of problems associated with tradition systems and methods for procuring telecommunications products and/or services. In Figure 1, a system 100 for procuring telecommunications products and/or services is shown and includes one or more customers 102 and 104 and customer devices 102a and 104a (i.e., a telephone and personal computer) coupled to a communications network 106 (i.e., a Public Switched Telephone

Network (PSTN) or the Internet). Numerous personnel 108, such as core customer representatives, implementation engineers, implementation coordinators, order distributors, etc., via devices 108a, can connect to the communications network 106 and are employed for procuring telecommunications products and/or services for the customers 102 or 104 under such flow.

[29] Figure 2 is a flowchart illustrating a flow for procuring telecommunications products and/or services in the system 100. In Figure 2, at step 202, the customer 102 or 104 is pre-qualified by a core customer representative 108 for telecommunications products and/or services desired by the customer 102 or 104. At step 204, customer contract and information are entered by the core customer representative 108. At step 206, a contract package and forms needing signatures are generated by the core customer representative 108. At step 208, an implementation engineer 208 performs a technical review of the telecommunications products and/or services desired by the customer 102 or 104. At step 210, validation and submission to order entry for the telecommunications products and/or services desired by the customer 102 or 104 are performed by an implementation coordinator 108. At step 212, order entry for the telecommunications products and/or services desired by the customer 102 or 104 is performed by the implementation coordinator, the implementation engineer and/or the order distributor 108. At step 214, order tracking is performed by the implementation coordinator 108, completing the flow for procuring telecommunications products and/or services.

[30] Accordingly, such flow involves numerous personnel 108 and time-consuming processing steps 202-214 in order to procure telecommunications products and/or services for the customer 102 or 104. The present invention addresses the problems with such flow for procuring telecommunications products and/or services and is further described with reference to Figures 3-6.

[31] Referring to the drawings, wherein like reference numerals designate identical or corresponding parts throughout the several views, and more particularly to Figure 3 thereof, there is illustrated is a top level block diagram of a system 300 for procuring telecommunications

products and/or services on-line, according to the present invention. In Figure 3, the system 300 may include, for example, one or more customers 302, 304 and 306 and respective customer devices 302a, 304a and 306a (e.g., telephones, personal computers, hand-held devices, etc.) for procuring telecommunications products and/or services on-line. The devices 302a, 304a and 306a may be coupled to a telecommunications service procurement system 310 via a communications network 308 (e.g., a Public Switched Telephone Network (PSTN), the Internet, an Intranet, etc.).

[32] For devices 302a, such as conventional telephony devices, wireless telephony devices, etc., the present invention may be implemented via voice command, speech synthesis, Dual-Tone MultiFrequency (DTMF) input, etc., functions provided in the devices 302a and corresponding voice activated menu, speech recognition, DTMF detection, etc., functions provided by the telecommunications service procurement system 310 over the communications network 308 and based on the processes described in the present invention, as will be appreciated by those skilled in the relevant art(s).

[33] For devices 304a, such as personal computers, etc., the present invention may be implemented via the use of web browser, graphical user interface (GUI), etc., functions provided in the devices 304a and corresponding web server, etc., functions provided by the telecommunications service procurement system 310 over the communications network 308 and based on the processes described in the present invention, as will be appreciated by those skilled in the relevant art(s).

[34] For devices 306a, such as personal digital assistants (PDAs), etc., the present invention may be implemented via the use of Wireless Application Protocol (WAP), Microsoft CE, Palm OS, GUI, etc., functions provided in the devices 306a and corresponding web server, etc., functions provided by the telecommunications service procurement system 310 over the communications network 308 and based on the processes described in the present invention, as will be appreciated by those skilled in the relevant art(s).

[35] The system 300 and the telecommunications service procurement system 310 are further described in the commonly owned co-pending United States Patent Application to *Felkey et al.*, filed herewith, entitled "METHOD AND SYSTEM FOR PROCURING TELECOMMUNICATIONS SERVICES ON-LINE," Serial No. xx/xxx,xxx, Atty. Dock. No. 09710-1116/WMA-01-001. The system 300 includes software integration, which is further described in the commonly owned co-pending United States Patent Application to *Felkey et al.*, filed herewith, entitled "METHOD AND SYSTEM FOR PROVIDING SOFTWARE INTEGRATION FOR A TELECOMMUNICATIONS SERVICES ON-LINE PROCUREMENT SYSTEM," Serial No. xx/xxx,xxx, Atty. Dock. No. 09710-1124/WMA-01-004.

[36] Customer service personnel 314 and/or "swivel-chair" operators 316 may access the telecommunications service procurement system 310, for example, via a back office graphical user interface (GUI) running on the devices 314a and 316a over, for example, a proprietary communications network 312 (e.g., an Intranet, a virtual private network, etc.) in order to procure telecommunications products and/or services for the customers 302, 304 or 306. The customer service personnel 314 may provide, for example, customer service functions, while the swivel-chair operators 316 may be assigned to, for example, process accepted orders, process modified orders, process supplemental orders, etc.

[37] Similarly, the customers 302, 304 or 306 may order telecommunications products and/or services on-line via a customer GUI running on the devices 302a, 304a and 306a over the communications network 308. The back office GUI and the customer GUI are further described herein with respect to Figure 5-6.

[38] In Figure 3, the devices 302a, 304a and 306a and the respective devices 314a and 316a of the customer service personnel 314 and the swivel-chair operators 316 may communicate with the telecommunications service procurement system 310 using, for example, TCP/IP via the communications networks 308 and 312, respectively. The devices 302a, 304a and 306a and the devices 314a and 316a may include a modem function (e.g., dial-up, DSL, cable, wireless, etc.)

that can log in to the telecommunications service procurement system 310 with user validation (e.g., via a personal identification number (PIN), user name and password, etc.).

[39] The telecommunications service procurement system 310 may include all software and hardware to provide, for example, user account maintenance, validation and access control level (ACL) information, a directory server where a customer's personal information is kept, etc. The devices 302a, 304a and 306a, the devices 314a and 316a, the telecommunications service procurement system 310, etc., may be implemented using one or more of the computer system 701 of Figure 7, for example.

[40] Accordingly, the devices 302a, 304a and 306a, the devices 314a and 316a, the telecommunications service procurement system 310, etc., may include any suitable servers, workstations, personal computers (PCs), personal digital assistants (PDAs), Internet appliances, other devices, etc., capable of performing the processes of the present invention. The devices 302a, 304a and 306a, the devices 314a and 316a, the telecommunications service procurement system 310, etc., may communicate with each other using any suitable protocol via the communications networks 308 and 312.

[41] It is to be understood that the system 300 in Figure 3 is for exemplary purposes only, as many variations of the specific hardware used to implement the present invention are possible, as will be appreciated by those skilled in the relevant art(s). For example, the functionality of one or more of the devices 302a, 304a and 306a, the devices 314a and 316a, the telecommunications service procurement system 310, etc., may be implemented via one or more programmed computers or devices. To implement such variations as well as other variations, a single computer (e.g., the computer system 701 of Figure 7) may be programmed to perform the functions performed by, for example, the devices 314a and 316a shown in Figure 3. On the other hand, two or more programmed computers or devices, for example as in shown Figure 7, may be substituted for any one of the devices 302a, 304a and 306a, the devices 314a and 316a, the telecommunications service procurement system 310, etc., of Figure 3. Principles and advantages of distributed processing, such as redundancy, replication, etc., may also be

implemented as desired to increase the robustness and performance of the system 300, for example.

[42] The communications networks 308 and 312 may be implemented via one or more communications networks (e.g., the Internet, an Intranet, a wireless communications network, a satellite communications network, a cellular communications network, a Public Switched Telephone Network (PSTN), a hybrid network, etc.), as will be appreciated by those skilled in the relevant art(s). In a preferred embodiment of the present invention, the communications networks 308 and 312 may employ electrical, electromagnetic, optical signals, etc., that carry digital data streams, as are further described with respect to Figure 7.

[43] Figure 4 is a flowchart illustrating a flow for procuring telecommunications products and/or services on-line, according to the present invention. In Figure 4, at step 402, the customer 302, 304 or 306 is pre-qualified and orders telecommunications products and/or services via the customer GUI. At step 404, technical review, validation and submission to order entry are performed by a service coordinator (e.g., customer service personnel 314, swivel-chair operators 316, etc.). At step 406, order entry for the telecommunications products and/or services desired by the customer 302, 304 or 306 is performed by the service coordinator. At step 408, order tracking is performed by the service coordinator, completing the flow for procuring telecommunications products and/or services, according to the present invention.

[44] Accordingly, the flow for procuring telecommunications products and/or services, according to the present invention, does not involve numerous personnel 108 or time-consuming processing steps 202-210, in order to procure telecommunications products and/or services for a customer, as compared to the flow of Figures 1 and 2. Thus, the present invention addresses the noted problems with flow for procuring telecommunications products and/or services.

[45] The graphical user interface for procuring telecommunications products on-line may now be described with reference to Figures 5-6.

[46] Figure 5a is a top level block diagram illustrating a logical architecture employed in the system 310 for a customer graphical user interface for procuring telecommunications products

on-line, according to the present invention. In Figure 5a, the logical architecture includes a web tier 502a, an application tier 504a, a database tier 506a and a service availability tool (SAT) 508a. The application tier 504a communicates with the database tier 506a using, for example, Java DataBase Connectivity (JDBC). The application tier 504a communicates with the SAT 508a using, for example Internet Inter-ORB Protocol (IIOP).

[47] The web tier 502a is responsible for delivering web content 512a (e.g., HyperText Markup Language (HTML) pages, static content, images, Javascript scripts and cascading style sheets, etc) to the client machines 302a, 304a and 306a and 314a and 316a of Figure 3. A customer graphical user interface (GUI) 544a is provided for the client machines 302a, 304a and 306a over the communications network 308 as described herein. A back office graphical user interface (GUI) 544a is provided for the client machines 314a and 316a over the communications network 312 as described herein. The swivel chair 316 and the customer service 314 personnel can perform swivel chair/back office functions via the back office GUI 542a.

[48] The client machines 302a, 304a and 306a and 314a and 316a running a web browser (e.g., Internet Explorer, Netscape, etc.) and via the respective GUIs 544a and 542a connect requested web pages and images from the web site via, for example, HyperText Transport Protocol (HTTP) and HyperText Transport Protocol Secure (HTTPS). Although lower layers generate the system's HTML pages, the web tier 502a manages the building blocks of the HTML pages (e.g., the content 512a, etc.). The HTTP and HTTPS requests are passed to a web server 510a. The web server 510a serves up requests that it can fulfill and forwards user actions and HTML requests to a presentation tier 524a.

[49] The application tier 504a includes the presentation tier 524a framework (e.g., Cygent's presentation tier framework, etc.). Functionality from the presentation tier 524a framework (e.g., Cygent's Small Business Portal, etc.) is leveraged to build a customer portal 532a. This is achieved by reusing and/or configuring the existing JavaServer Pages (JSPs) and objects including transition and display policies of the presentation tier framework 524a.

[50] A back office portal 530a, on the other hand, is custom constructed, but designed with the presentation tier 524a framework (e.g., the Cygent framework, etc.) in mind. In other words, the

pages are named in a consistent manner with the rest of the portals, and the same is true for the transition policies and display policies and objects.

[51] The application tier 504a includes a business and integration tier 526a (e.g., Cygent's Business tier and Integration tier, etc.). The business and integration tier 526a is a home for various components, such as activity and domain objects of three functional areas included therein: order management 528a, online ordering 534a and user management 536a. In Figure 5a, communications messaging interfaces (CMIs) and handlers are included in the business and integration tier 526a. The business and integration tier 526a communicate with the presentation tier 524a using, for example, Remote Method Invocation (RMI).

[52] Domain objects to handle the ordering functionality (e.g., Cygent's ordering functionality domain objects, etc.) were extended and a custom CMI and pricing adapter as an extension to a pricing scheme (e.g., Cygent's pricing scheme, etc.) were designed. Activity objects also referred to as managers or controllers (e.g., Cygent managers or controllers, etc.) are used to coordinate the ordering activities and functions. Business rules (e.g., Cygent, etc.) to constrain the ordering activities as needed are also employed. Existing database 542a tables (e.g., Cygent, etc.) are used to persist online ordering data. Additional tables are designed to extend such schema. Such tables are also mapped to display objects and domain objects (e.g., using a TopLink for Java tool, etc.).

[53] Pre-qualifying a customer 302, 304 or 306 for products and/or services employs an application to make a call out to the SAT 508a, which is, for example, Common Object Request Broker Architecture (CORBA) based. A custom CMI and adapter was designed to handle that function.

[54] The system hardware and software are further described in the commonly owned co-pending United States Patent Applications to *Felkey et al.*, filed herewith, entitled "METHOD AND SYSTEM FOR PROVIDING SOFTWARE INTEGRATION FOR A TELECOMMUNICATIONS SERVICES ON-LINE PROCUREMENT SYSTEM," Serial No. xx/xxx,xxx, Atty. Dock. No 09710-1124/WMA-01-004, "METHOD AND SYSTEM FOR PROCURING TELECOMMUNICATIONS SERVICES ON-LINE," Serial No. xx/xxx,xxx, Atty. Dock. No. 09710-1116/WMA-01-001.

[55] The web site of the present invention allows businesses to, for example, research telecommunications products and/or services, obtain price quotes, order those products and services, track order status, receive monthly statements, manage their account at any time, etc. The web site also allows the web site's customer support team members (e.g., the customer support 314 and swivel chair operator 316 personnel, etc.) to retrieve and process orders, track and update status, and interactively assists customers 302, 304 and 306.

[56] This following description describes such features, functions and processes of the present invention. The web site home page is a customer-facing avenue to various services. Once registered, a customer can take full advantage of the many features. Such as, browsing products to learning about the many services on the web site.

[57] Figure 5b is an exemplary screen shot illustrating the customer graphical user interface (GUI) 544a of the web site including, for example, links 502b to residential, business and small business customer home pages. A search field and button 506b is provided for searching the web site or the Internet. Links 508b and 512b include, for example, links to information about the web site, information for telecommunications products and service for residential, business and small business customers, tools and resources, career opportunities, news articles, investor relations, etc., which may be displayed in section 504b. Stock prices and worldwide site information may be provided in section 510b.

[58] Figure 5c is an exemplary screen shot illustrating another page of the customer GUI 544a including, for example, links 502c to information about what the web site can do for customers, links 504c for providing information about the telecommunications products and services provided by the web site, on-line tools 508c, such a tool for researching telecommunications products and service, a product match maker tool, a proposal or quote generator tool, a technical consultant tool, such as on-line chat, instant messaging, etc., an on-line ordering tool, etc.

[59] Also provide are, for example, a link 510c for accessing information about featured products and/or services, a link 512c for accessing information about special offers, member's login section 514c, a search area 516c, etc.

[60] Figure 5d is an exemplary screen shot illustrating the customer GUI 544a including, for example, a customer account section 502d for logging in using a user name and password 504d

via a “log in” button 506d. A “forgot password” button 508d is provided for existing customers for generating an e-mail to the customer with password information. A “sign up now” link 510d is provided for new customers.

[61] The GUI 544d also includes, for example, a support section 512d with links 514d to customer support, links 516d for real time chat or instant messaging with customer support personnel, etc., a search section 518d, links to shopping cart and checkout functions 520d, an on-line glossary 522d, on-line help 524d, privacy information 526d, information about the web site 528, etc. Also provided are, for example, a section 530d for graphic illustrations, a products and services section 532d including, voice 540d, Internet 542d, mobile telecommunications 544d, etc., products and services, a product category description section 534d with high level product description 546d, dropdown menus 548d for the respective products, etc. Links 566d, for example, to pertinent articles 536d, featured products and/or services 538d, etc., also are provided.

[62] Registering on the web site requires a minimal amount of information. Once registered, a customer may log in whenever they visit the site to access full site functionality. To register, a customer clicks on the “sign up now” button 510d and an exemplary registration page shown in Figure 5e is displayed. The customer enters the noted information 502e and clicks on “continue” or “cancel” buttons 504e. A confirmation page displays.

[63] Figure 5f is an exemplary screen shot illustrating of the web site page for a logged in customer. To log out of a customer session, the customer clicks on the “log out” button 502f. The web site page for the logged in customer also includes, for example, an “account review” link 504f, a “saved product info” link 506f, an “invite colleagues” link 508f, a “notification list” link 510f, an “edit profile link” 512f, etc.

[64] Once registered and in future visits, a customer may save their shopping cart from session to session, track and manage services, etc. If the customer wishes to edit his/her profile, he/she clicks the “edit profile” button 512f and the exemplary registration screen shown in Figure 5g is generated. In the registration screen the customer enters customer profile information 502g (e.g., first name, last name, etc.) and 506g (e.g., password, password confirmation, etc.), clicks on the “submit changes” or “cancel” buttons 504g and a confirmation page displays.

[65] As a registered and logged in customer, the customer, for example, can order the web site products and services and save the details of his/her order for future decisions via the shopping cart function 520d. The web site glossary 522d allows a customer look up technical terms and unfamiliar words. The keyword search function 518d is available to help locate items. Using quotes around terms with “and” therebetween may be used to refine a search. In this case, the search engine searches, for example, the pages that contain both or all of the keywords entered. Using quotes around terms with “or” therebetween may be used to expand a search. In such a case, the search engine will search for pages containing any of the keywords entered.

[66] There are a variety of telecommunications products and/or services that may be reviewed on the web site. To browse any of the web site’s suites of products and services, a customer links to the product information 532d by the category 540d, 542d, 544d, etc., of the product desired. The products may be categorized, for example, in three areas 540d, 542d and 544d each including an overview of the product offering. For example, a “voice center” category 540d may include “complete calling,” “long distance,” “toll free,” “conferencing,” “calling card,” etc., products and/or services, a “net connect” category 542d may include “dial up Internet,” “dedicated Internet” etc., products and/or services, a “mobile solutions” category 544d may include “paging,” “conferencing,” “calling card,” “dial up,” etc., products and/or services, etc.

[67] For information and review of a particular product or service, for example, in the “net connect” category 542d, the customer clicks on the “net connect” category 542d and the dropdown list 548d of the various products in the “net connect” category 542d appears. Clicking on “overview” in the dropdown list 548d provides additional product information. Clicking on the product and/or service in the dropdown list 548d results in product and/or service information for the selected product appearing. Clicking on a “learn more” button provides additional price and product information.

[68] A product quote may be obtained by navigating down into the product and/or service desired. For example, if a customer wishes to obtain a quote for “long distance” under the “voice center” category 540d, the customer clicks on the “voice center” category 540d and a list of products 548d is generated. The customer then selects “long distance” from the list 548d and clicks on “save this info” to save a quote. The customer may click on the “saved product info”

button 506f to run the quote at a later time. Figure 5h is an exemplary screen shot of a product quote page, for example, including, product or service information 502h, a “product advisor” button 504h, a related articles button 506h, a product “details” button 508h, etc. As shown in Figure 5i, the product quote page may include, for example, “order now,” “add to cart,” “save this info,” etc., buttons 502i.

[69] Typically orders are entered on-line directly by the customer. The customer inquires for a quote in the web site, saves it to a shopping cart, accepts the “terms and conditions” to see a shopping cart summary, supplies billing and credit information and finally clicks on a “submit” button to submit the shopping cart information. This causes the web site system, for example, to convert the shopping cart information into an order, add tracking information, send notification to the web site’s in-house credit department, send a notification message to the customer, initialize the order to prompt the back office for operational support system (OSS) application (e.g., OrderPro, etc.) processing, etc.

[70] In the above processing, clicking on the “order now” button 502i of the product quote page of Figure 5i displays the exemplary product order registration form shown in Figure 5j. Existing customers then enter their user name and password 504j and click on the “continue” button 506j an exemplary product order form of Figure 5k is displayed. New customers are referred to section 508j and click on the “continue” button 510j to start the registration process. It is noted that, advantageously, a new customer does not have to register on the web site until he/she is ready to purchase products and/or services in order to not turn away potential customers not wishing to have to register as a precondition to shopping on-line.

[71] The order process then involves the customer completing all information on a product order form, clicking on a “continue” button at which point a billing page displays. If previous orders have been placed on the web site customer information is automatically populated. The customer then selects a payment method from a dropdown list and clicks on a “continue” button and an exemplary order review page shown in Figure 5k displays.

[72] The customer may then review the order detail and click on “submit” or “cancel” buttons 514k. When the order is submitted, an order confirmation page displays. A copy of the confirmation page can be printed by clicking on “Print” button. The order review page of Figure

5k includes, for example, an accept terms and conditions section 510k, order contact information 502k, product information 506k, product pricing information 504k, billing information 508k, etc., which may be edited via respective "edit" buttons 512k. After the customer is finished reviewing the order page he/she clicks on the "submit" button 514k and an exemplary order confirmation page shown in Figure 5l displays and the order is submitted. The order confirmation page may include, for example, a confirmation notice 502l and "send," "clear" and "to manage services" buttons 504l.

[73] To review order status, a customer clicks on the "account review" button 504f and an exemplary account review page of Figure 5m displays. This page provides details on all orders processed to the account. To obtain further details on an order, the customer clicks on a "details" link 508m for a respective order in the order summary section 506m and an exemplary order status and details screen of Figure 5n displays. The order status and details screen may include, for example, a message section 502n, a status tracker 504n (e.g., showing steps completed in the order, etc.), service details 506n, pricing and billing information 508n, a modify service section 510n (e.g., move, change, other service, etc.), "submit" and "cancel" buttons 512n, etc.

[74] An "MCD" operation is defined in the web site as a Move, Change or Disconnection of an order after the order has been entered into the OSS order application (e.g., OrderPro, etc.) and fulfilled. An MCD is a service change request. To enter an MCD a customer choose the action to be performed, for example, "move," "change," "disconnect," etc., from the modify service section 510n. The customer then enters information about the MCD requests (e.g., contact information, etc.) and clicks on the "submit" or "cancel" buttons 512n. A confirmation page displays.

[75] The shopping cart may be triggered when "add to cart" button is selected displaying an exemplary shopping cart page shown in Figure 5o. Once a product is in the shopping cart a customer may change the product quantity in section 506o, remove an item from the cart via "remove" via buttons 512o, update the order via an "update" button 504o, clear the entire cart via a "clear cart" button 510o, obtain further product details by clicking on a product in the section 506o, print the cart, e-mail the cart, proceed to checkout via button 508o, etc.

[76] A customer may obtain technical support by navigating to the technical support page on the web site by clicking on the “help” button 524d. An exemplary help page with a help message 502p as shown in Figure 5p displays. The customer then navigates to a “technical support” link on a section 504p of the help page. From this link the information (e.g., browser specifications and requirements, cookies, spawning windows, bookmarks, etc.) can be obtained and displayed in sections 506p.

[77] Questions and help assistance with all products or the order process can be obtained by using the “support and solve link” 512d to display an exemplary help page shown in Figure 5q. The customer then may click on a “chat,” “e-mail,” “schedule a call,” etc., buttons 506q” in section 504q to perform a requested with the customer support team (e.g., the customer support 314 and swivel chair operator 316 personnel, etc.).

[78] To use the chat feature and contact a specialist on the customer support team (e.g., the customer support 314 and swivel chair operator 316 personnel, etc.), a customer clicks on the “open chat” button 506q and an exemplary open chat dialogue box of Figure 5r displays. A welcome message is displayed in the section 502r and the customer types his/her inquiry in a text box 504r or clicks on an “exit” button to end the chat session. A copy of the chat session may be printed via a “print” button.

[79] Figure 6a is an exemplary screen shot illustrating a logged in user “search” screen 602a of the back office graphical user interface (GUI) 542a of the web site after a customer support team member (e.g., the customer support 314 and swivel chair operator 316 personnel, etc., also referred to a “user”) is logged in. To log in to the back office GUI 542a, the user points his/her browser to a back office log in IP address and enters his/her user name and password in user name password fields provide in a log in form and clicks a “sign in” button. To log out of a back office session, the user chooses a “log off” tab located in section 604a. The section 604a also includes, for example, “user home,” “manage agents,” “customer home,” “shop,” “cart,” etc., tabs. The search screen 602a also includes, for example, a “search for” dropdown list 606a, a search criteria section 608a, “reset” and “search” buttons 610a, a “reports” section 612a, a maintain “NASP ID” link 614a, etc.

[80] If a user forgets his/her password, a back office administrator may reset same. Each back office customer support team member has a user account for the web site back office GUI 542a. An Administrator may be employed to register new back office users.

[81] An “administrative” login gives a different level of access or permissions. An “administrator,” a person who has administrative permissions, may, for example, register new back office users, reset a user’s password, create, modify, and delete back office users, etc.

[82] To create and manage back office users, the administrator clicks on a “manage agents” tab in section 604a, clicks on a “create” button 608b in an exemplary “manage agents” screen 602b shown in Figure 6b, completes “create agent detail information” fields and clicks a “continue” button. To view or modify back office users, the administrator selects an agent from a list box 606b and clicks on a “modify” button 610b.

[83] To modify or make changes to a back office user’s profile shown in an exemplary screen 602c of Figure 6c, the administrator makes changes and clicks on “save” or “cancel” buttons 606c. Such changes may include, for example, changes to a user’s password, other information, etc., in section 604c. A dropdown list 604b may be used to select a “user type” for filtering purposes.

[84] The administrator may also assigning orders to an integration engineer (IE). To do the administrator performs a search from the screen of Figure 6a for an order to be assigned and an order search results page displays. The administrator then clicks a link to an order number in the search results page to display an exemplary “order detail” screen 602d of Figure 6d displays. The administrator then navigates to an “assigned IE” field in the information section 604d and from a pull down list chooses an IE for order assignment and clicks on an “update” button 608d. The order detail screen 602d also includes, for example, “previous” and “next,” buttons 610d, an order summary section 606d, a “back” button 612d, a “notes” button 614d, etc.

[85] The administrator may also maintain a NASP ID by clicking on the link 614a in the screen of Figure 6a in which case an exemplary “maintain NASP ID” screen 602e of Figure 6e displays. The administrator may then update NASP threshold and ranges by entering a new start and end range for NASP IDs in section 604e and clicking a “create new range” button 606e and

by entering a new threshold and clicking a “save threshold” button 608e. A “cancel” button 610e is also provided.

[86] To reset a customer’s password, a user clicks on the “user home” tab in section 604a, enters a customer’s search using the dropdown list 606a and the search criteria 608a. An exemplary customer search results page 602f shown in Figure 6d displays. The search results page 602f includes, for example, “back,” “previous,” “next,” etc., buttons 610f, search results summary area 604f, sort up down buttons 608f, etc.

[87] The user then selects the customer from links 606f in the results page 602f and an exemplary customer summary page 602g shown in Figure 6g displays. The customer summary page 602g includes, for example, a customer information section 606g, “view notes,” “manage users,” “modify customer information,” “create MCD,” links, etc., section 604g.

[88] To reset the selected customer’s password, the user clicks on the “manage users” link in section 604g and an exemplary “manage users” screen 602h of Figure 6h displays. The user then clicks on a “reset password” button in a section 606h of the screen 602h to reset the password for the user. A confirmation text message in “red” displays in the screen 602h an e-mail is sent to the customer with new password information. The screen 602h may also include, for example, “back,” “modify,” “unlock user,” “activate/inactivate,” etc., tabs in the section 606h and other user information in section 604h.

[89] User profiles can be managed in the back office for both customers 302, 304 and 306 and back office users 314 and 316. A user may view a customer profile by clicking on the “user home” tab in section 604a of Figure 6a. To display the entire list of customers 302, 304 and 306, the user select “customer” from search dropdown list 606a and clicks on the “search” button 610a. A list of all customers 302, 304 and 306 displays as shown in Figure 6f. To search for a specific customer or company, the user enters a username/company in the search criteria 608a and clicks on the search button 610a. From the search results page, the user clicks on the “View Customer Profile” link 606f and the customer summary page of Figure 6g appears. The user then may update customer profile information by clicking on the “modify customer information” link in the section 604g of the “customer summary” screen 602g of Figure 6g in which case an exemplary “modify customer” screen of Figure 6i displays. The user may then make the

appropriate changes to the customer information fields 604i, billing address 606i fields and payment information fields 608i. The user then clicks on the “modify” or “cancel” buttons in section 610i of the screen 602i.

[90] To view a profile of back office personnel, the administrator chooses a “user type” from the dropdown list 604b of Figure 6b, chooses a user from the filtered list, 606b, and clicks on the “modify” button 610b to change or view the selected user’s profile shown in Figure 6c.

[91] To view a service address, from the “customer summary” screen 602g of Figure 6g, the user clicks on a “view service address” link in the customer information section 606g and the exemplary screen 602j of Figure 6j displays. The user may then enter/view service address details 604j and 606j. Module - 7 Browsing Products From the Back Office

[92] A back office user may obtain product information by activating the “shop” tab in section 604a of Figure 6a. Selecting the “shop” tab display an exemplary screen 602k shown in Figure 6k including product links 604k. Clicking on a product link 604k displays product details as shown in the exemplary screens of Figures 6l and 6m and including product details 604l, “back” and “add to cart” buttons 606l, and 606m, pricing details 604m, etc.

[93] With the above screens, a user can enter or complete an order for a customer by clicking the “add to cart” button in which case the shopping cart of Figure 6o appears. The user can then remove, delete a specific item, empty items, empty all items in the cart, update, update the quantity, shop more, continue to shop and add more products, checkout, proceed to the complete the order, etc., for the customer, via sections 604o-608o.

[94] For example, to proceed to checkout, depending on the type of product ordered a product configuration page may appear and if so the user fills out the requested fields and clicks a “next” button. The order details may be reviewed and clicking on a “submit” button commences processing of the order. Otherwise, the user clicks on the “back,” “cancel” etc., buttons in section 608o.

[95] To view an order, the user enters an order search, a list of orders appears, the user navigates to the specific order to be viewed, or clicks on the order number to view the order details or clicks the customer name to display customer and order details. To change the status of a submitted order, the user navigates to the order details page of Figure 6o, choose a specific

product on section 606o of order detail page, from a "status" column in section 604o clicks a "submitted" link to drill down into an order status as shown in the exemplary screen 602p of Figure 6p. The user in section 604p then uses a "change status to" dropdown list to select a new order status. The user then clicks on a "save and send" button in section 606p to generate an e-mail shown in Figure 6q. The user may also click on a "save and not send" e-mail button or a "cancel" button in section 606p. In a similar manner, tracking the status of an order, updating of order status, etc., may be performed by a user for a customer.

[96] The user may also enter an MCD, by navigating and then clicking on the "create MCD" link of section 604g of the screen 602g of Figure 6g in which case the exemplary "create MCD" page of Figure 6r displays. The user may then enter the MCD information (Move, Change or Disconnect details) 604r-606r and click a "continue" button 610r. An exemplary verification screen 602s of Figure 6s displays. The user then may check all information 604s and click a "continue" button 606s. An exemplary "MCD Successfully Completed" verification screen 602t as shown in Figure 6t displays including the submitted MCD information 604t.

[97] In addition, searching of an "order," "customer," "MCD," etc., can be performed via the dropdown list 606a of the search screen 602a of Figure 6a. Further, reports can be created, modified, etc., via the report section 612a.

[98] The present invention may store information relating to various processes described herein. Such information may be stored in one or more memories, such as a hard disk, optical disk, magneto-optical disk, RAM, etc. One or more databases, such as the databases included in the systems and methods of Figures 3-6, may store the information used to implement the present invention. The databases may be organized using data structures (e.g., records, tables, arrays, fields, graphs, trees, and/or lists) included in one or more memories, such as the memories listed above or any of the storage devices listed below in the discussion of Figure 7, for example.

[99] The previously described processes may include appropriate data structures for storing data collected and/or generated by the systems and processes of Figure 3-6 in one or more databases thereof. Such data structures accordingly may include fields for storing such collected and/or generated data. In a database management system implementation, data may be stored in

one or more data containers, each container including records and the data within each record may be organized into one or more fields. In a relational database systems implementation, the data containers may be referred to as tables, the records may be referred to as rows and the fields may be referred to as columns. In an object-oriented database implementation, the data containers may be referred to as object classes, the records may be referred to as objects and the fields may be referred to as attributes. Other database architectures may be employed and may use other terminology. Systems that implement the present invention may not be limited to any particular type of data container or database architecture.

[100] All or a portion of the invention (e.g., as described with respect to Figures 3-6) may be conveniently implemented using one or more conventional general purpose computers, microprocessors, digital signal processors, micro-controllers, etc., programmed according to the teachings of the present invention (e.g., using the computer system of Figure 7), as will be appreciated by those skilled in the computer art. Appropriate software may be readily prepared by programmers of ordinary skill based on the teachings of the present disclosure, as will be appreciated by those skilled in the software art. In addition, the present invention (e.g., as described with respect to Figures 3-6) may be implemented by the preparation of application-specific integrated circuits or by interconnecting an appropriate network of conventional component circuits, as will be appreciated by those skilled in the electrical art(s). Further, the present invention may be implemented on the World Wide Web (e.g., using the computer system of Figure 7).

[101] Figure 7 illustrates a computer system 701 upon which the present invention (e.g., systems and methods of Figures 3-6, etc.) may be implemented. The present invention may be implemented on a single such computer system or a collection of multiple such computer systems. The computer system 701 includes a bus 702 or other communication mechanism for communicating information, and a processor 703 coupled to the bus 702 for processing the information. The computer system 701 also includes a main memory 704, such as a random access memory (RAM), other dynamic storage device (e.g., dynamic RAM (DRAM), static RAM (SRAM), synchronous DRAM (SDRAM)), etc., coupled to the bus 702 for storing information

and instructions to be executed by the processor 703. In addition, the main memory 704 can also be used for storing temporary variables or other intermediate information during the execution of instructions by the processor 703. The computer system 701 further includes a read only memory (ROM) 705 or other static storage device (e.g., programmable ROM (PROM), erasable PROM (EPROM), electrically erasable PROM (EEPROM), etc.) coupled to the bus 702 for storing static information and instructions.

[102] The computer system 701 also includes a disk controller 706 coupled to the bus 702 to control one or more storage devices for storing information and instructions, such as a magnetic hard disk 707, and a removable media drive 708 (e.g., floppy disk drive, read-only compact disc drive, read/write compact disc drive, compact disc jukebox, tape drive, and removable magneto-optical drive). The storage devices may be added to the computer system 701 using an appropriate device interface (e.g., small computer system interface (SCSI), integrated device electronics (IDE), enhanced-IDE (E-IDE), direct memory access (DMA), or ultra-DMA).

[103] The computer system 701 may also include special purpose logic devices 718, such as application specific integrated circuits (ASICs), full custom chips, configurable logic devices (e.g., simple programmable logic devices (SPLDs), complex programmable logic devices (CPLDs), field programmable gate arrays (FPGAs), etc.), etc., for performing special processing functions, such as signal processing, image processing, speech processing, voice recognition, infrared (IR) data communications, etc.

[104] The computer system 701 may also include a display controller 709 coupled to the bus 702 to control a display 710, such as a cathode ray tube (CRT), liquid crystal display (LCD), active matrix display, plasma display, touch display, etc., for displaying or conveying information to a computer user. The computer system includes input devices, such as a keyboard 711 including alphanumeric and other keys and a pointing device 712, for interacting with a computer user and providing information to the processor 703. The pointing device 712, for example, may be a mouse, a trackball, a pointing stick, etc., or voice recognition processor, etc., for communicating direction information and command selections to the processor 703 and for

controlling cursor movement on the display 710. In addition, a printer may provide printed listings of the data structures/information of the systems and methods shown in Figures 3-6, or any other data stored and/or generated by the computer system 701.

[105] The computer system 701 performs a portion or all of the processing steps of the invention in response to the processor 703 executing one or more sequences of one or more instructions contained in a memory, such as the main memory 704. Such instructions may be read into the main memory 704 from another computer readable medium, such as a hard disk 707 or a removable media drive 708. Execution of the arrangement of instructions contained in the main memory 704 causes the processor 703 to perform the process steps described herein. One or more processors in a multi-processing arrangement may also be employed to execute the sequences of instructions contained in main memory 704. In alternative embodiments, hard-wired circuitry may be used in place of or in combination with software instructions. Thus, embodiments of the present invention are not limited to any specific combination of hardware circuitry and/or software.

[106] Stored on any one or on a combination of computer readable media, the present invention includes software for controlling the computer system 701, for driving a device or devices for implementing the invention, and for enabling the computer system 701 to interact with a human user (e.g., a user of the systems and methods of Figures 3-6, etc.). Such software may include, but is not limited to, device drivers, operating systems, development tools, and applications software. Such computer readable media further includes the computer program product of the present invention for performing all or a portion (if processing is distributed) of the processing performed in implementing the invention. Computer code devices of the present invention may be any interpretable or executable code mechanism, including but not limited to scripts, interpretable programs, dynamic link libraries (DLLs), Java classes and applets, complete executable programs, Common Object Request Broker Architecture (CORBA) objects, etc. Moreover, parts of the processing of the present invention may be distributed for better performance, reliability, and/or cost.

[107] The computer system 701 also includes a communication interface 713 coupled to the bus 702. The communication interface 713 provides a two-way data communication coupling to a network link 714 that is connected to, for example, a local area network (LAN) 715, or to another communications network 716, such as the Internet. For example, the communication interface 713 may be a digital subscriber line (DSL) card or modem, an integrated services digital network (ISDN) card, a cable modem, a telephone modem, etc., to provide a data communication connection to a corresponding type of telephone line. As another example, communication interface 713 may be a local area network (LAN) card (e.g., for Ethernet™, an Asynchronous Transfer Model (ATM) network, etc.), etc., to provide a data communication connection to a compatible LAN. Wireless links can also be implemented. In any such implementation, communication interface 713 sends and receives electrical, electromagnetic and/or optical signals that carry digital data streams representing various types of information. Further, the communication interface 713 can include peripheral interface devices, such as a Universal Serial Bus (USB) interface, a PCMCIA (Personal Computer Memory Card International Association) interface, etc.

[108] The network link 714 typically provides data communication through one or more networks to other data devices. For example, the network link 714 may provide a connection through local area network (LAN) 715 to a host computer 717, which has connectivity to a network 716 (e.g. a wide area network (WAN) or the global packet data communication network now commonly referred to as the "Internet") or to data equipment operated by service provider. The local network 715 and network 716 both use electrical, electromagnetic and/or optical signals to convey information and instructions. The signals through the various networks and the signals on network link 714 and through communication interface 713, which communicate digital data with computer system 701, are exemplary forms of carrier waves bearing the information and instructions.

[109] The computer system 701 can send messages and receive data, including program code, through the network(s), network link 714 and communication interface 713. In an Internet example, a server (not shown) might transmit requested code belonging to an application

program for implementing an embodiment of the present invention through the network 716, LAN 715 and communication interface 713. The processor 703 may execute the transmitted code while being received and/or store the code in storage devices 707 or 708 or other non-volatile storage for later execution. In this manner, computer system 701 may obtain application code in the form of a carrier wave. With the system of Figure 7, the present invention may be implemented on the Internet as a Web Server 701 performing one or more of the processes according to the present invention for one or more computers coupled to the Web server 701 through the network 716 coupled to the network link 714.

[110] The term "computer readable medium" as used herein refers to any medium that participates in providing instructions to the processor 703 for execution. Such a medium may take many forms, including but not limited to, non-volatile media, volatile media, transmission media, etc. Non-volatile media include, for example, optical or magnetic disks, magneto-optical disks, etc., such as the hard disk 707 or the removable media drive 708. Volatile media include dynamic memory, etc., such as the main memory 704. Transmission media include coaxial cables, copper wire, fiber optics, including the wires that make up the bus 702. Transmission media can also take the form of acoustic, optical, or electromagnetic waves, such as those generated during radio frequency (RF) and infrared (IR) data communications. As stated above, the computer system 701 includes at least one computer readable medium or memory for holding instructions programmed according to the teachings of the invention and for containing data structures, tables, records, or other data described herein. Common forms of computer-readable media include, for example, a floppy disk, a flexible disk, hard disk, magnetic tape, any other magnetic medium, a CD-ROM, CDRW, DVD, any other optical medium, punch cards, paper tape, optical mark sheets, any other physical medium with patterns of holes or other optically recognizable indicia, a RAM, a PROM, and EPROM, a FLASH-EPROM, any other memory chip or cartridge, a carrier wave, or any other medium from which a computer can read.

[111] Various forms of computer-readable media may be involved in providing instructions to a processor for execution. For example, the instructions for carrying out at least part of the present invention may initially be borne on a magnetic disk of a remote computer connected to either of

networks 715 and 716. In such a scenario, the remote computer loads the instructions into main memory and sends the instructions, for example, over a telephone line using a modem. A modem of a local computer system receives the data on the telephone line and uses an infrared transmitter to convert the data to an infrared signal and transmit the infrared signal to a portable computing device, such as a personal digital assistant (PDA), a laptop, an Internet appliance, etc. An infrared detector on the portable computing device receives the information and instructions borne by the infrared signal and places the data on a bus. The bus conveys the data to main memory, from which a processor retrieves and executes the instructions. The instructions received by main memory may optionally be stored on storage device either before or after execution by processor.

[112] While the present invention has been described in connection with a number of embodiments and implementations, the present invention is not so limited but rather covers various modifications and equivalent arrangements, which fall within the purview of the appended claims.